Aspidiotus destructor Signoret, an Armored Scale Pest New to the Hawaiian Islands[1]

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The coconut scale, *Aspidiotus destructor* Signoret, is distributed throughout much of the tropics (see Commonwealth Institute of Entomology Pest Distribution Map 218, June 1966). Although this scale has long been present on many Pacific Islands, it was not known to be established in Hawaii until 1968 when it was discovered infesting coconut palms at Kailua, on Windward Oahu (Tenorio, 1969). Since then the species has been found in many places on Oahu, principally near the coast, and appears to be spreading. To date, *A. destructor* has not been found on any of the other islands of Hawaii.

The coconut scale is among the most damaging of all armored scale insects. It has been a major coconut pest in many areas where this palm is grown for food and copra, and has also been a serious pest of bananas in some areas. Other crops which are known to be attacked include avocado, breadfruit, ginger, guava, mango and papaya. In addition, *A. destructor* infests a wide range of ornamental trees and shrubs. Dekle (1965), for example, lists over 140 known hosts in Florida alone. On Oahu this scale has been found chiefly on coconut, banana, and papaya, but has been recorded also from mountain apple (*Eugenia malaccensis* L.). As the distribution of the scale in Hawaii contunues to expand we may expect to find it on many additional hosts.

Aspidiotus destructor typically occurs in densely massed colonies on the leaves of its hosts. On coconut and banana the scales occur mostly on the lower surfaces of the leaves and, except in extremely heavy infestations, mature scales are confined principally to older leaves. The presence of *A. destructor* infestations is generally accompanied by a distinct yellowing of the leaf areas occupied by the scales. Although other armored scale insects such as *Chrysomphalus ficus* (Ashmead) often produce leaf chlorosis, the yellowed areas associated with them usually are more mottled in appearance than is the case with *A. destructor*. Severe infestations cause the premature death of infested leaves, loss of vigor, and reduction in fruit production. In some areas of the Pacific coconut trees have been almost completely defoliated by this pest (Taylor, 1935).

A. destructor is the fourth species of the genus *Aspidiotus*[2] which has been

[1]Published with the approval of the Director of the Hawaii Agricultural Experiment Station as Journal Series No. 1179.

[2]Here I have accepted the relatively strict definition of the genus *Aspidiotus* proposed by Ferris (1941).

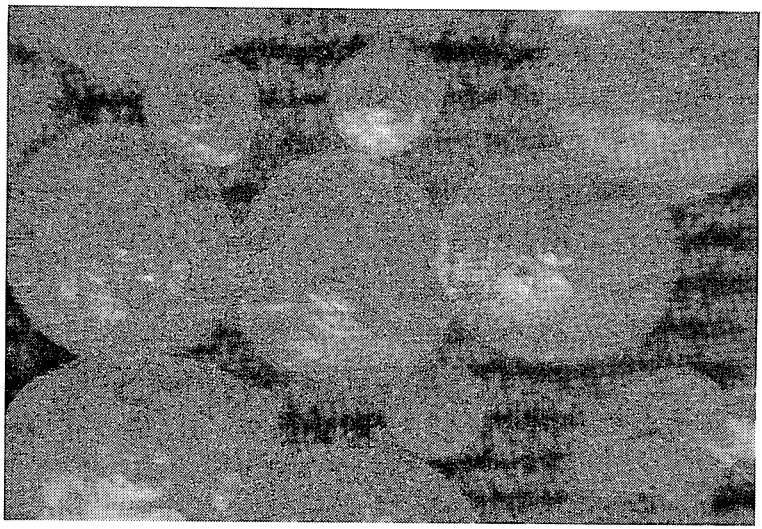

FIG. 1. *Portion of colony of Aspidiotus destructor on coconut leaf.*

found established in Hawaii. This species is fairly easy to recognize in the field by virtue of its usual occurrence in closely packed colonies and by the thin, semitransparent, milky-white, circular scale which covers the female insect (Fig. 1). The living female insects are orange-yellow in color and are readily visible through the scale covering. *A. destructor* is a bisexual species, as are most armored scales. As they near maturity the scales of males may be recognized by their elongate oval shape.

For the benefit of those who may wish to verify the identity of scales with slide-mounted specimens, a key to the *Aspidiotus* of Hawaii and a detailed drawing of the female insect (Fig. 2) are presented here. The drawing, by the late G. F. Ferris and first published in the Atlas of Scale Insects of North America, Vol. 2, is reproduced here with the kind permission of the Stanford University Press.

The life history of *A. destructor* was studied in Fiji by Taylor (1935). In Fiji the total life cycle of females, from egg to the beginning of oviposition, required 34–35 days, and the oviposition period occupied an additional 9 days. Males required 30–35 days to complete development. The average number of eggs produced by females on coconut was 90. Taylor states that males are superfluous in this species and that progeny of both sexes are produced by parthenogenesis. However, cytological studies of *A. destructor* based on material from several localities in the West Indies, have revealed no evidence of parthenogenesis (Brown, 1965).

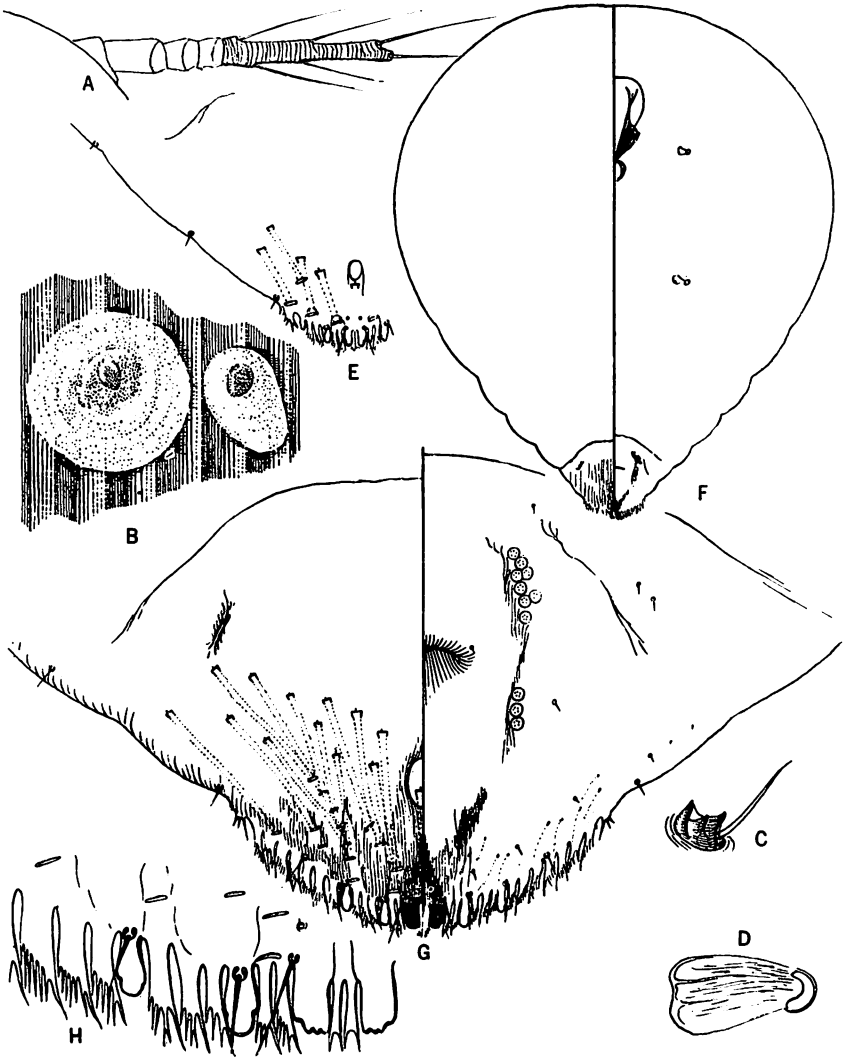

FIG. 2. Aspsdiotus destructor *microscopic details of slide mounted specimens.*

NATURAL ENEMIES

Around 40 species of predators and parasites have been reported attacking *A. destructor* in areas outside Hawaii. Several of these natural enemies have been successfully utilized to control outbreaks of this scale (Sweetman, 1958). Taylor (1935) gave a detailed account of the campaign against this scale in Fiji, where control was achieved primarily by a purposely introduced coccinellid beetle, *Cryptognatha nodiceps* Marshall. In Mauritius

and in Indonesia another coccinellid, *Chilocorus politus* Mulsant, has been most effective. Recently, another coccinellid, *Pseudoscymnus anomalus* Chapin, was reported to be effective against this scale in Micronesia (R. P. Owen, personal communication).

On Oahu, two species of coccinellid beetles, *Telsimia nitida* Chapin and *Lindorus lophanthae* (Blaisdell), were the principal predators found attacking *A. destructor*. These beetles were introduced into Hawaii many years ago to combat other scale pests. A predaceous thrips, *Aleurodothrips fasciapennis* (Franklin), also was found associated with coconut scale infestations here.

Two species of internal parasites, both minute aphelinid wasps, have been reared from *A. destructor* here. These were identified by Dr. David Rosen (Dept. of Biological Control, Univ. of California at Riverside) as *Aphytis chrysomphali* (Mercet) and *Aphytis* sp., near *lingnanensis* Compere.

Key to the Species of Aspidiotus Known to Occur in the Hawaiian Islands
(*mature females*)

1. Anal opening very small (7–8 μ long), located only slightly more than the length of one median pygidial lobe anterior to bases of lobes..... .....*spinosus* Comstock
– Anal opening larger (13–25 μ long), located two or more times the length of a median pygidial lobe anterior to bases of lobes.....2
2. Dorsal tubular ducts of pygidium elongate, up to 100 μ in length; no duct openings found anterior to hind margin of posterior group of perivulvar pores (Fig. 2).....*destructor* Signoret
– Dorsal tubular ducts of pygidium relatively short, around 12–16 μ in length; some ducts on lateral part of pygidium opening as far forward as anterior end of posterior perivulvar pore cluster.....3
3. Area surrounding spiracular openings faintly but distinctly sclerotized; median pygidial lobes notched on inner and outer edges..... .....*selangorensis* Williams
– Area surrounding spiracular openings unsclerotized; median pygidial lobes notched on outer faces only.....*hederae* Vallot

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